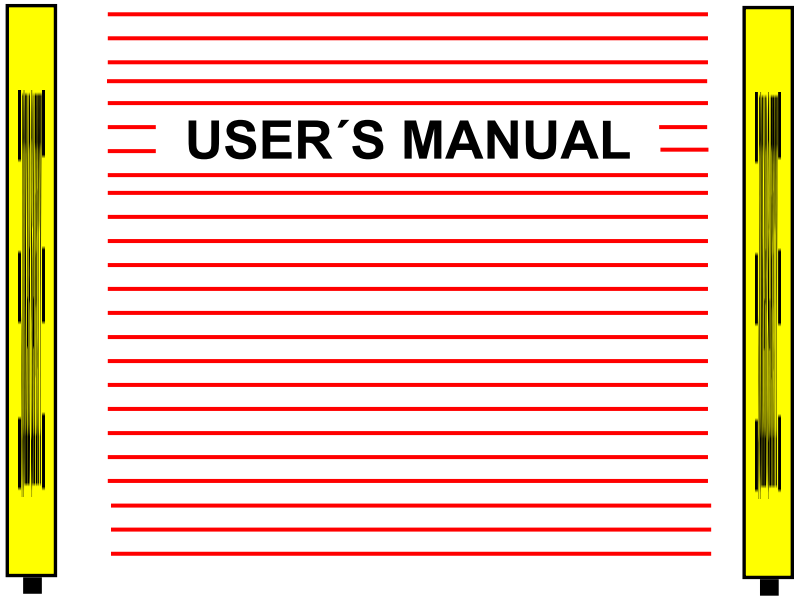
JOKAB SAFETY

FOCUS

INFRARED SAFETY BARRIERS

Focus 4 series
Type 4

Focus 2 series
Type 2



Focus series User's manual

CE

The FOCUS Safety barrier complies with CE provisions according to the following directives:

-98/37/EC Machinery Directive
-73/23/EEC Low-Voltage directive resp. 93/68/EEC
-EN 61496-1:1997
-prEN 61496-2:1997
-DIN V VDE 0801:1990 and amendment A1:1994
-EN 50081-2:1993
-EN 55022:1998
-EN 60204-1:1997 (as applicable)

The barrier is certified by TUV to safety standard EN 61496-1/2 Type 2/4

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USER'S MANUAL: Version 1.3 dated 28-04-2003

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While every effort has been taken to ensure the accuracy of the information contained in this manual JOKAB SAFETY cannot accept responsibility for errors or omissions and reserves the right to make changes and improvements without notice. It is the users responsibility to ensure that this equipment is correctly designed, specified , installed, cared for and operated to meet all applicable local, national and international codes/regulations. Technical data given in this manual is correct to the level of accuracy of JOKAB SAFETY's test procedures as verified by various international approved bodies. Other information (such as application examples, wiring diagrams, operation or use) is intended solely to illustrate the various uses of our products. JOKAB SAFETY does not guarantee or imply that the product when used in accordance with such examples in a particular environment will fulfil and particular safety requirement and does not assume any responsibility or liability for actual use of the product based on the examples given. Printed in Sweden.

1 BEFORE USE

- **GENERAL INFORMATION**
  Before using the Focus barriers all personnel responsible for the installation and operation of this equipment must ensure that they have read and are conversant with the information contained in this manual.
  It is essential that the Safety Barriers are operated and installed in accordance with the instructions in this manual. All relevant standards and regulations regarding the use of this type of device must also be strictly adhered to.
  The barrier does not contain any parts that are subject to maintenance. In all cases however, the power supply must be disconnected before proceeding with any internal examination/intervention.
  In case of malfunction, the barrier must be sent to our laboratories with a description of the anomaly found and the length of time the unit has been in service.

- **REGULAR MAINTENANCE**
  Except for the cleaning of the polycarbonate front covers that protect the optical elements, the barrier does not contain any parts that are subject to maintenance. The system however should be regularly checked and inspection results recorded.
  Do not use woollen cloths or solvents or any material that could scratch or attack the front cover polycarbonate surface.
  The interval between cleaning will depend upon the local environmental conditions in which the barrier is operating.
  Note. Any deterioration in the protection covers e.g. by dirt etc. will not compromise the system's safety in any way but may cause the barrier to stop operating.

Jokab Safety AB does not accept any liability for damage or injury due to incorrect use of the protection barriers or associated components.

2 GENERAL DATA AND MAIN APPLICATIONS

Focus units are safety barriers for use in environments where it is essential to safeguard the safety of the operator using machinery, robots or other dangerous automated systems, and where casual and/or unauthorised access may be gained to hazardous parts.
The barriers provide coverage of the protected area by the generation of infrared beams, which are able to detect an object located within their field of operation.
The barriers comply with the requisites for Type 2 (Focus 2 series), and Type 4 (Focus 4 series) safety devices according to the provisions of the latest international regulations and IEC 61496 1-2 in particular.
Models are available that provide protection heights of between 150 mm and 1650mm.
All the control and command function electronics are contained within the profile housing; external connections being made via a M12 connector situated at the end of the barrier. There are no connections between the transmitter and the receiver, as synchronisation between the two units is achieved optically. Control and management of the beams transmitted and received is achieved by two microprocessors that also provide information on the status of the barrier via several led indicators. There are two alignment leds to aid installation.
The *muting and override* functions are available on all the Focus barrier models and are enabled by simply connecting the LMS warning light, which is available separately.
Versions are also available with the *floating blanking* function: this function offers the possibility to partially exclude a predetermined 'floating' portion of the barrier.

Note.
Muting, override and *floating blanking* all effectively override the system and therefore certain precautions must be put in place to limit the degradation of the level of safety when these functions are operational.

3 OPERATION

The barrier consists of two units, one with transmitting optical elements (Transmitter) and one with receiving optical elements (Receiver). All the photosensitive elements are regularly scanned in sequence so that any objects placed between the transmitter and the receiver are detected. Upon detection the operation of the equipment being controlled is interrupted by means of the switching of the safety barrier outputs. Barrier response times vary from 14 to 45ms according to the model. Led indicators display the operating status of the machinery as well as any anomalies in the *reset*, *test* and *muting* inputs (for the models with this option).
The operator has a multifunction pushbutton, which is used for the following:

- **TEST:** If pressed during normal operation, it checks that all the system, comprising the barrier and the machinery interface, is operating correctly. Pressing the button (opening contact) basically simulates the interruption of one or more of the safety barriers beams making it possible to check that the machinery stops in the time and way set.
- **RESTART:** If pressed after the barrier has detected an object, (manual reset condition) the system will be reset providing there is no obstruction of the barrier beams
- **ALIGNMENT:** If the button is pressed when there is no power supply to the barrier and then power is restored, (whilst the button is being pressed), the barrier enters alignment mode, i.e. it provides an indication of the centring of the top and bottom optical beams by means of two yellow leds.
- **OVERRIDE:** (only present if the *muting* function is operational) If the button is pressed within 5 seconds of switching on the barrier and is kept pressed for at least 5 seconds, the barrier's outputs will switch only if the beams are interrupted. This condition stops as soon as the button is released or automatically after 120 seconds.

1. ***Automatic reset***: After the barrier has detected an object, it will return to normal operation as soon as the object is removed.
2. ***Manual reset***: Normal operating mode is only restored after the object has been removed and the reset button has been pressed.

To enable the *muting* function, the LMS muting indicator must be connected **when the barrier is not connected to the power supply,** as shown in section 6, and then the barrier's power supply must be restored. To disable the muting function, the LMS muting indicator must be disconnected **when the barrier is not connected to the power supply**, and then the barrier's power supply restored.

Please remember that by enabling/disabling the *muting* function the *override* function is automatically enabled/disabled.

The outputs of the safety barrier are PNP transistors. Should the load to be controlled have alternating current or require more than 500mA consumption, a safety relay is necessary, this converts the transistor outputs into relay contact outputs whose operation is directly tested and controlled by the safety relay module itself.

4 PRECAUTIONS AND CRITERIA FOR INSTALLATION

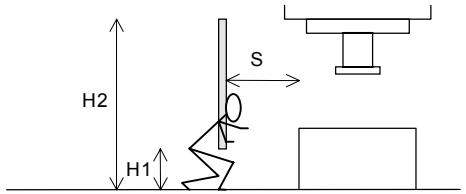
The area where the barrier is to be installed must be compatible with the device technical specifications. The temperature of the environment, interference caused by electromagnetic disturbance and sources of light etc, should be assessed prior to the installation of the barrier.

4.1 CALCULATION OF THE MINIMUM DISTANCE FOR INSTALLATION

The safety distance 'S' is the minimum distance that must be maintained between the safety barrier and the dangerous area/position of the machine. The safety distance must guarantee that the operator cannot reach the danger zone before the machines moving parts have stopped. The formula to calculate the safety distance for multi-beam barriers is as follows:

$$S = (K * T) + C$$

S = Safety distance.
T = T1 + T2
where T1 = machinery's response time in seconds.
T2 = barrier's response time in seconds.
K = approach speed of the body to the danger zone:
2000 mm/s for Fx-14 or 35 models, 1600mm/s for Fx-K models
C =8*(d-14)mm for Fx-14 or 35 models, 850 mm for Fx-K models where d is the minimum object that can be detected (35mm for Fx-35 and 14mm for Fx-14)



S = safety distance.
H1 = the bottom beam must not have a height above **300 mm** .
H2 = the top beam must not be below **900 mm** .

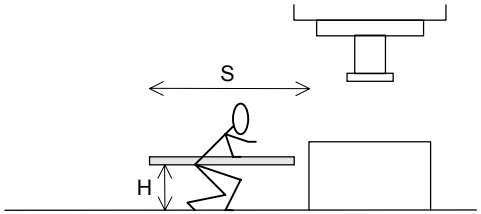
The Focus Fx-K series has beams set to meet the accepted standards. Please note the required bottom beam height (1st beam height) from the floor in the following table.

Beam height from floor	4 Beams (900 unit)	4 Beams (1200 unit)	3 Beams	2 Beams
1st Beam height	300 mm	300 mm	300 mm	400 mm
2nd Beam height	600 mm	700 mm	700 mm	900 mm
3rd Beam height	900 mm	1100 mm	1100 mm	
4th Beam height	1200 mm	1500 mm		

If the barrier is installed in a horizontal position the distance between the danger zone and the furthest beam must be equal to the result of the calculation using the previous formula, but with the following parameters:

$$S = (K * T) + C$$

T= T1 + T2
where T1 = machinery's response time in seconds.
T2 = barrier's response time in seconds.
K = 1600 mm/s (approach speed of the body to the danger zone).
C = 1200 - 0.4 * H.
H = height (in mm) of the optical beams compared to the floor.



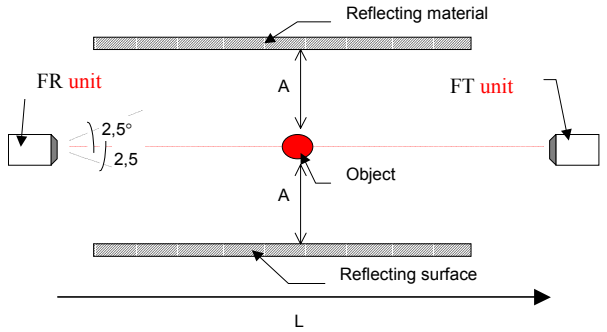
S = safety distance.
H = the optical beam must have a height between **225 mm** and **1000mm**.

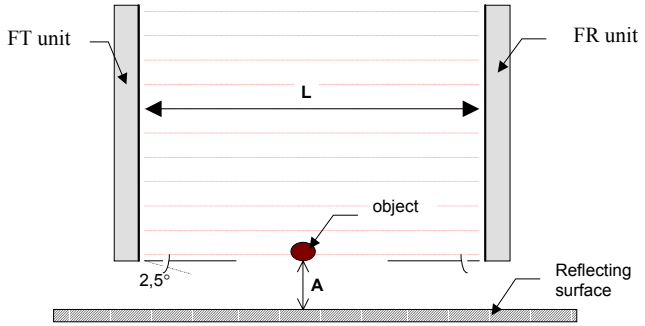
4.2 REFLECTING SURFACES

Should there be any reflecting surfaces close to the safety barrier, the clearance distance must be sufficient to safeguard against passive reflections. The distance can be calculated with the formula:

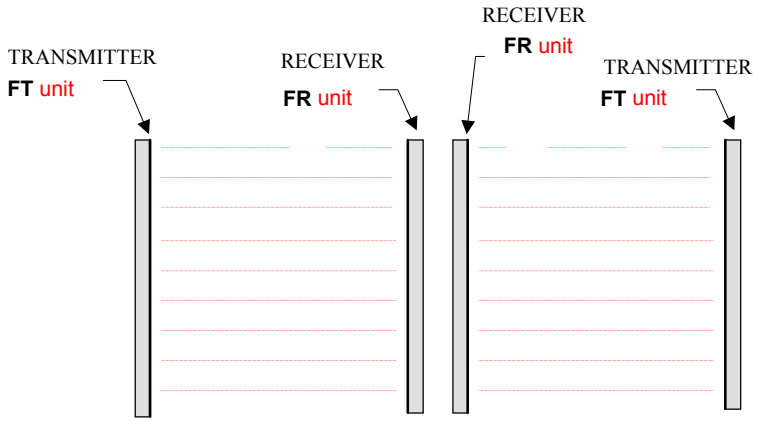
$$A = 0.04366 * L$$

where '**A**' and '**L**' are expressed in mm



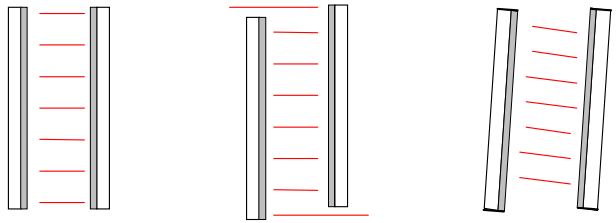


If several barriers are used, care must be taken that each transmitter does not interfere with the receiver of a nearby barrier. Barriers should be installed as below:



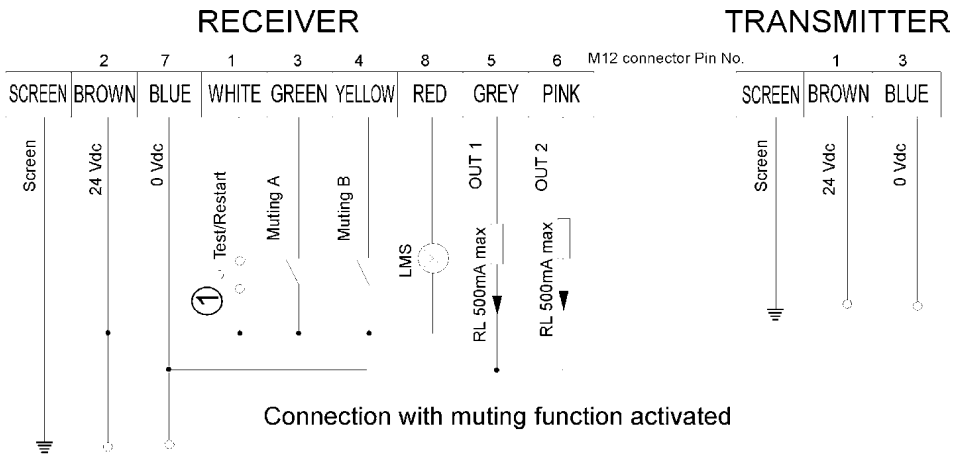
5 MECHANICAL ASSEMBLY

Use the appropriate brackets provided to complete the mechanical assembly.
The fixing brackets for the transmitter/receiver units slide in the profile slots so that they can be placed at an equal distance from each other.

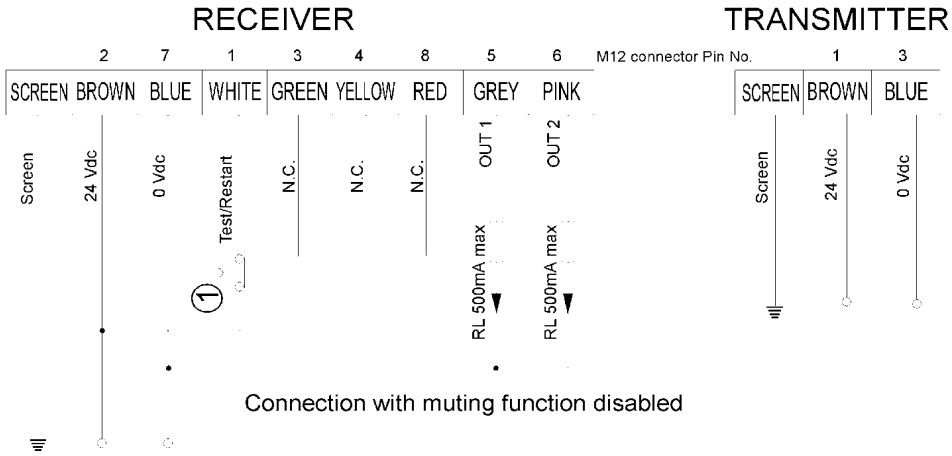


6 CONNECTIONS

6.1 CABLE REFERENCES:



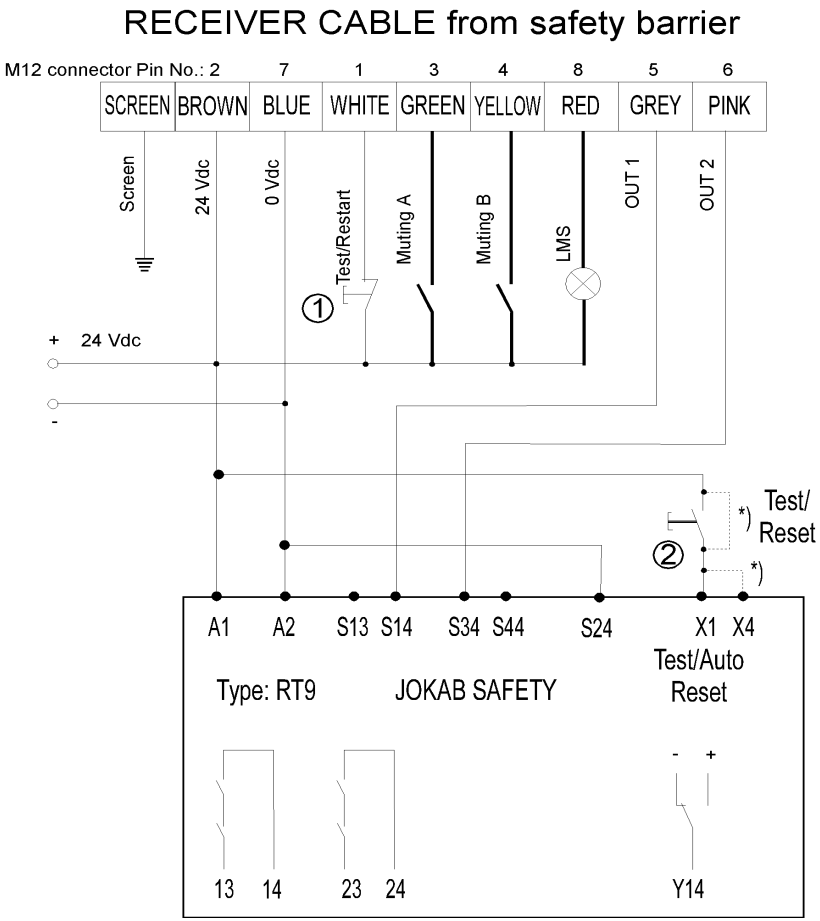
Connection with muting function activated



Connection with muting function disabled

Note. A N/C. voltage free contact from a button or an automatic device, such as a PLC, must be connected across the Test/Restart input①.

6.2 CONNECTIONS WITH SAFETY RELAY:

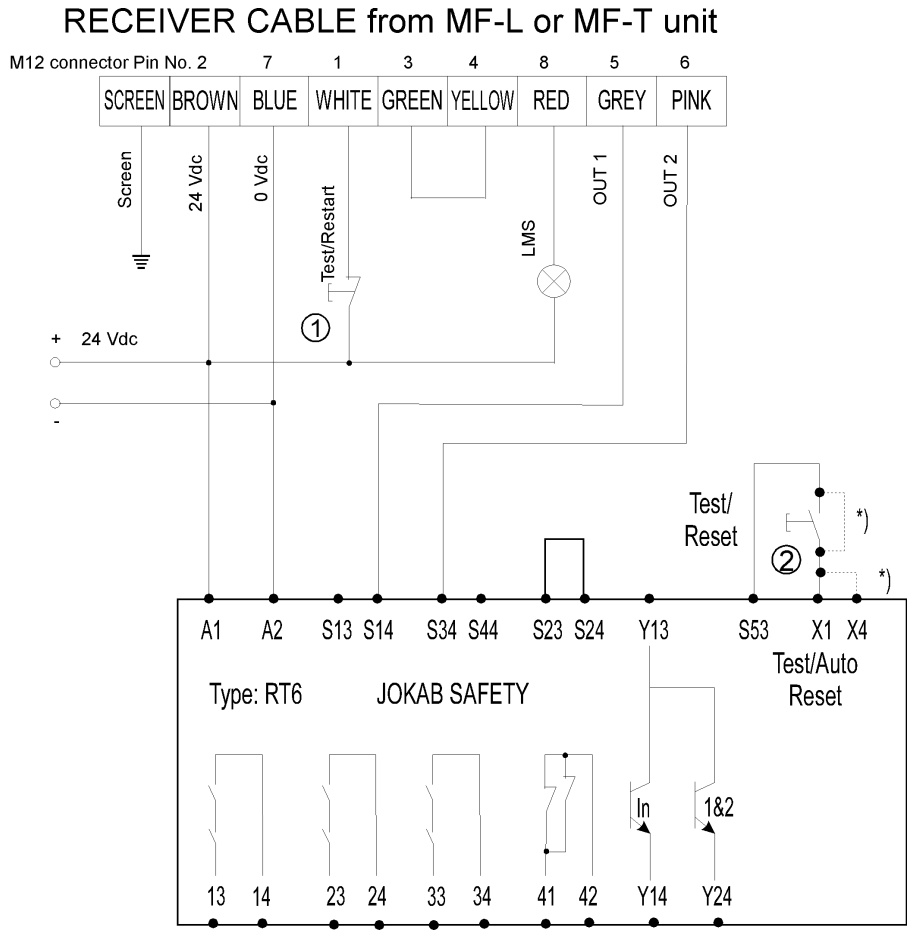


Note. Do not make the connections shown in bold type if the muting function is not required.
Test/Restart pushbutton no① has a multifunction (see Section 3 Operation Page 7). Normally this is the button to use and button no 2 is bypassed. The safety relay is connected for **(*)** automatic reset.

Test/Reset pushbutton no② Safety Relay Manual reset. This button can be used if the barrier is set internally for automatic restart and button 1. Is bypassed or connected and used for alignment only.

Notice: both buttons can not be used at the same time.

Connection scheme if a safety relay is connected to the muting activator unit MF-L or MF-T which is added to the safety barrier.



Test/Restart pushbutton no① has a multifunction (see Section 3 Operation Page 7). Normally this is the button to use and button no 2 is bypassed. The safety relay is connected for **(*)** automatic reset.

Test/Reset pushbutton no② – Safety Relay Manual reset. This button can be used if the barrier is set internally for automatic restart and button 1. Is bypassed or connected and used for alignment only.

Notice: both buttons can not be used at the same time.

6.3 NOTES ON CONNECTIONS

- Power to the system must be by a 24V DC supply which complies with standard EN 60742 (dual isolation), or with equivalent isolation, e.g. VDE 0551.
- The light barrier must be protected with an external fuse having a rated breaking current of 1A normal

- The TEST/RESTART button must be located so that the operator can see the protected area when restarting, testing or overriding.
- The external illuminated indicator for '*muting override'* enabled must be located so that it can be seen from all sides of the machine operation.
- Read Section 9 on the *muting* function and its use before locating the sensors for the activation of this function.

- Check that the load to be switched by the barrier's PNP transistor outputs does not exceed 500 mA. A protection device will automatically limit output current to 500 mA. If loads with currents in excess of 500mA and up to 6A, and/or alternating current are to be switched, a safety relay must be connected to the outputs as shown in Section 6.2

6.4 CODES AND SPECIFICATIONS OF AVAILABLE MODELS

The columns "Number of modules" and "Number of optical beams per module" refer to *muting* operation management (see section 9.3).

The following table shows the standard models available in the Focus Fx-14 series, based on the barriers protection length and operating features.
All the models in the Focus Fx-14 series guarantee 14 mm resolution.

Models	Protection length (mm)	Total length (mm) L	Total number of optical beams	Response time (ms)	Number of modules	Number of optical beams per module
Fx-14-150	150	247	21	15	7	3
Fx-14-300	300	350	42	18	7	6
Fx-14-450	450	497	63	22	7	9
Fx-14-600	600	644	84	24	6	14
Fx-14-750	750	791	105	27	7	15
Fx-14-900	900	938	126	30	6	21
Fx-14-1200	1200	1232	168	36	8	21
Fx-14-1500	1500	1526	210	42	10	21
Fx-14-1650	1650	1673	231	45	11	21

The following table shows the standard models available in the Focus Fx-35 series, based on the barriers protection length and operating features:
All models in the Focus Fx-35 series guarantee 35 mm resolution.

Models	Protection length (mm)	Total length (mm) L	Total number of optical beams	Response time (ms)	Number of modules	Number of optical beams per module
Fx-35-150	150	247	8	14	4	2
Fx-35-300	300	350	16	14	4	4
Fx-35-450	450	497	24	16	4	6
Fx-35-600	600	644	32	16	4	8
Fx-35-750	750	791	40	18	5	8
Fx-35-900	900	938	48	20	6	8
Fx-35-1200	1200	1232	64	22	4	16
Fx-35-1500	1500	1526	80	24	5	16
Fx-35-1650	1650	1673	88	26	4	22

The following table shows the standard (1) models available in the Focus Fx-K Grid series:

Models	Protection length (mm)	Total height (mm) L	Total number of optical beams	Response time (ms)	Number of modules	Number of optical beams per module
Fx-K2-500	500	599	2	14	2	1
Fx-K3-800	800	899	3	14	3	1
Fx-K4-900	900	999	4	14	4	1
Fx-K4-1200	1200	1299	4	14	4	1

(1) Many protected lengths not included in the list of standard models can be supplied on request.

7 ALIGNMENT PROCEDURE

After completing correct mechanical assembly and connections, as described in the previous sections, the barrier should be aligned as follows:

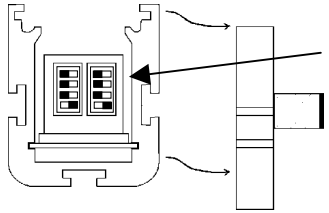
- Disconnect the barrier's power supply.
- Open the *test/restart* contact①.
- Restore the barrier's power supply.
- Adjust the direction of the barrier by moving the receiver or transmitter. The 2 yellow leds located on the receiver will both be lit when the barrier is aligned correctly.
- After aligning the barrier, secure the bolts firmly.
- Disconnect the power supply.
- Restore the barrier's power supply (with the *test/restart* contact closed); it will enter operating mode.
- Complete all the checks described in Section 11 "Final Checks" and Section 12 "Routine Checks and Maintenance".

8 OPERATING PROCEDURES

8.1 SETTING THE INTERNAL DIP-SWITCHES IN THE RECEIVER UNIT

- Disconnect the barrier's power supply and remove the Receiver's end cap that has the M12 connector fitted, so that the two banks of dip-switches can be reached.
- Use a suitably sized screwdriver to set the dip-switches as per the required configuration according to the following tables.

OFF ON	OFF ON
1	1
2	2
3	3
4	4



The switches are:
1 OFF
2 OFF
3 OFF
4 ON

Note. The two dip-switch banks in the receiver must be set in the same configuration. Switch default settings set by the factory are : Switches No's.1, 2 and 3 OFF, Switch No.4 ON.

8.1.1 SELECTION OF RESET MODE.

Switch No. 4	Reset
OFF	Manual
ON	Automatic

9 MUTING, OVERRIDE AND FLOATING BLANKING FUNCTIONS

9.1 GENERAL INFORMATION ON THE THREE FUNCTIONS

The *muting, override* and *floating blanking* functions enable the barrier (or a part of it) to be bypassed for operational requirements. As required by current standards, the barrier is provided with the necessary inputs for the activation of these functions. It should however be remembered that these functions basically override the system and they should therefore be used with due care.

9.2 MUTING FUNCTION

As previously mentioned, the *muting* function can be enabled on any barrier by simply connecting the LMS muting indicator when the barrier is switched off, as described in section 6.
The presence of the LMS indicator is recognised when the barrier is switched on. If its presence is detected, the barrier will enable the *muting* function, if its presence is not detected the barrier will ignore any request for *muting*. **It is important to note that if the *muting* indicator is connected when the barrier is already connected to the power supply, it will not be recognised and the *muting* function will not be enabled.** Once enabled, if the indicator develops a fault or is removed without first disconnecting the barrier's power supply, it will signal an error with the *muting* light, as described in section 10.
To disenable the *muting* function, therefore, the barrier's power supply must be turned on without the LMS muting indicator being connected.
In brief, this function, present on all barriers, is enabled and disenabled by means of the following simple procedures:

To enable the muting function :-
- Disconnect the barrier's power supply.
- Connect the LMS indicator and the muting sensors (see Section. 6)
- Restore the barrier's power supply.

To disable the muting function:-
Disconnect the barrier's power supply.
- Disconnect the LMS indicator and the muting sensors (see Section. 6)
- Restore the barrier's power supply.

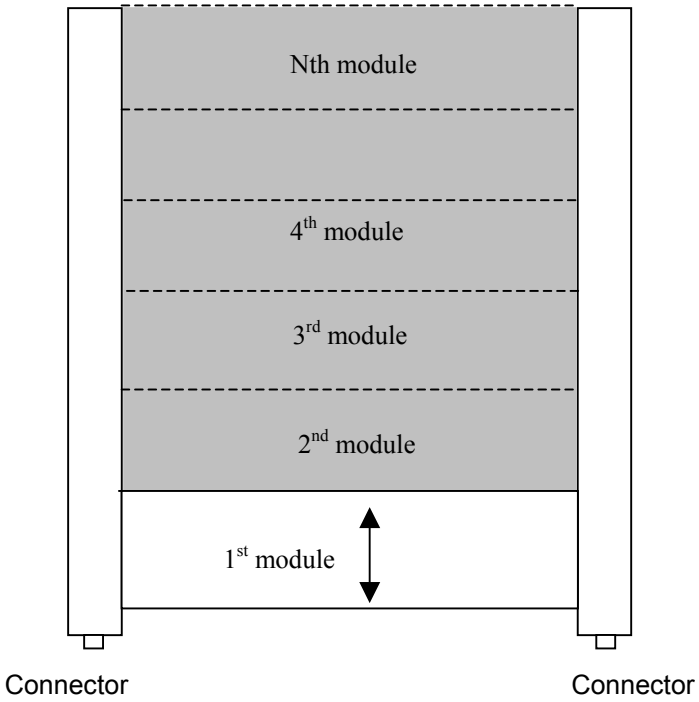
9.3 DESCRIPTION OF SINGLE MODULE MUTING AND MODULAR MUTING

With this series of barriers it is possible to specify *single module muting* or *modular muting* (Switch No.3 Receiver).

9.3.1 DEFINITION OF MODULE.

A Module is a section of the barrier whose size contains the amount of optical beams defined in the table in section 6.
For example, a Focus Fx-35-600 should be considered as 4 adjacent modules, each containing 8 optical beams giving a total of 32 optical beams, whereas a Focus Fx-14-300 should be considered as 7 adjacent modules, each containing 6 optical beams giving a total of 42 optical beams.
Various configurations can be achieved on request, according to requirements.

The layout of the modules is illustrated below:



9.3.2 SINGLE MODULE MUTING AND MODULAR MUTING.

Single module muting enables only one module at a time to be made transparent, whereas *modular muting* makes it possible to make two or more modules transparent, until even the whole barrier has been bypassed.
Should a muting request be made for modules that do not exist when in *single module muting* mode (for example bypassing of the 4th module with a barrier that only has three), the barrier will remain operational.
Please note that in *single module muting* it is not possible to select the module containing the synchronisation optical beam which is situated at the opposite end of the barrier to the M12 connector. In this case the muting function will not work.
Should a *modular muting* request also involve modules that do not exist (for example muting of modules 1+2+3+4 with a barrier that only has three), the barrier will enter total *muting* mode
Switch settings for the various *muting* modes are as follows:

9.3.3 SELECTION OF MODULAR MUTING MODE

Switches in Receiver unit			Modular muting
No.1	No.2	No.3	
OFF	OFF	OFF	Muting of all modules (standard setting)
OFF	ON	OFF	Muting of modules 1+2+3+4
ON	OFF	OFF	Muting of modules 1+2+3
ON	ON	OFF	Muting of modules 1+2

9.3.4 SELECTION OF SINGLE MODULE MUTING

Switches in Receiver unit			Muting of single module
No.1	No.2	No.3	
OFF	OFF	ON	Muting of module 1
OFF	ON	ON	Muting of module 2
ON	OFF	ON	Muting of module 3
ON	ON	ON	Muting of module 4

WARNING

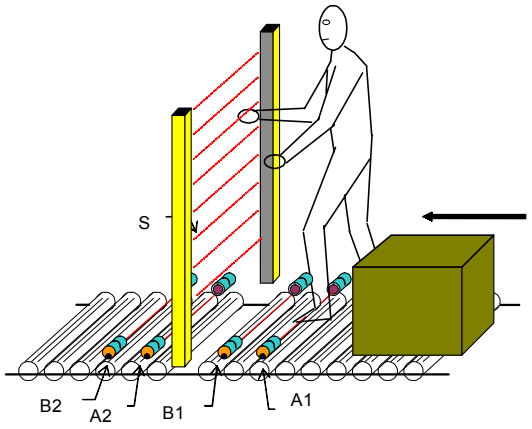
<u>There are two different dip-switch banks in the Receiver unit, both of these must be set in the same way.</u>

- **The *modular muting* function, with all modules activated (Switches 1,2 and 3 set in the OFF position) is the factory default setting.**

9.4 CRITERIA FOR INSTALLATION

All the *muting* sensors must be connected correctly in order to prevent their incorrect placement from causing undesired requests for *muting*.

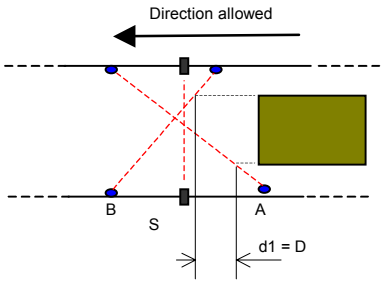
1. The *muting* sensors must recognise the whole length of the material (i.e. pallets, vehicles, etc).
2. The sensors must be arranged so that the material is always recognised throughout its transit through the protection barrier (grid/curtain).
3. The effect of various material transportation speeds during the duration of muting must be taken into account.
4. The safety barrier (grid/curtain) and *muting* sensors must be arranged so that the previous material clears the last *muting* sensor before the new material reaches the first sensors.



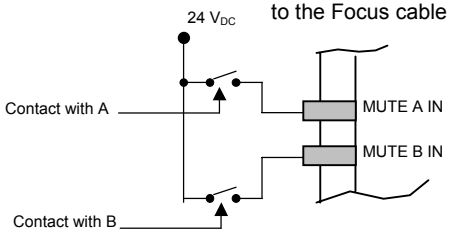
Installation example of barrier protection across a conveyor, which must allow a box to pass through, but not a person. The protection barrier **S** is connected to the control panel, and **A1**, **A2**, **B1** and **B2** sensors detect the passage of the box and enable the muting function. The contacts from these sensors are connected to the protection barrier receiver unit.
Sensors **A** and **B** can be optical, mechanical, proximity sensors, etc., having closed voltage free contact when an object is detected.

The following pages show several examples of configurations using the *muting* function:

1. Application with two sensors:

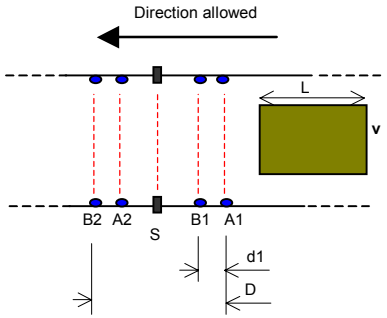


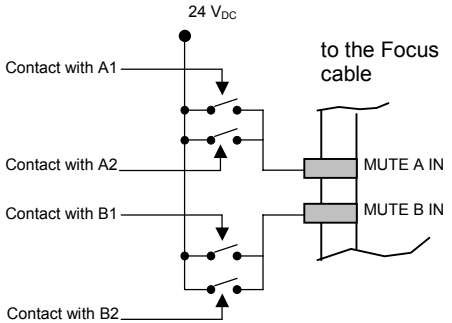
Connection of the muting sensors:



2. Application with four sensors and single direction for introduction of material:

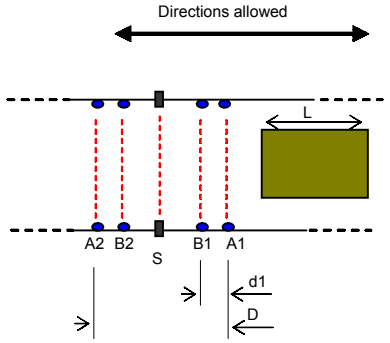
Connection of the muting sensors:

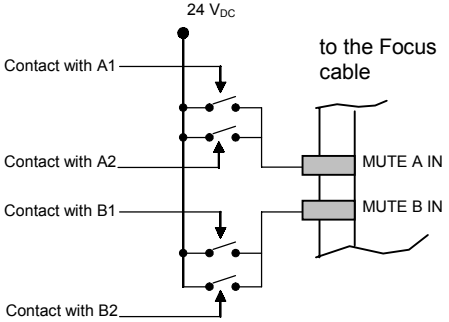




3. Application with four sensors and dual direction for introduction of material:

Connection of the muting sensors:





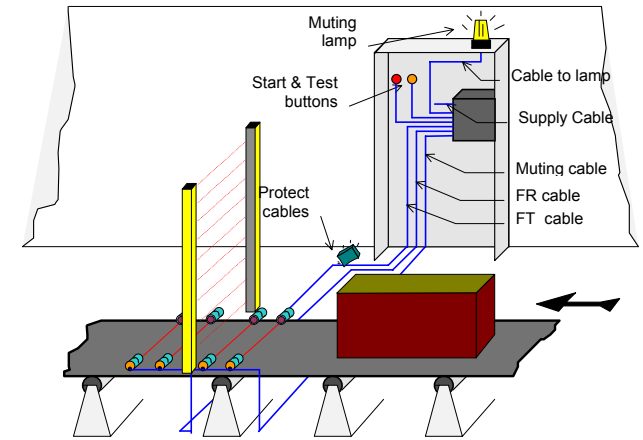
Where:

D = minimum distance for the *muting* sensors to keep the request operational; depends on the length of the box:
D < L.

d_1 = maximum distance required for the *muting* request to be accepted; depends on the speed of the box:

$$d_{max}\ [cm] = v[m/s] * 3[s] * 100$$

It is essential that this distance does not allow both sensors to be activated (at the same time) and thus *muting* if a person passes through by accident.



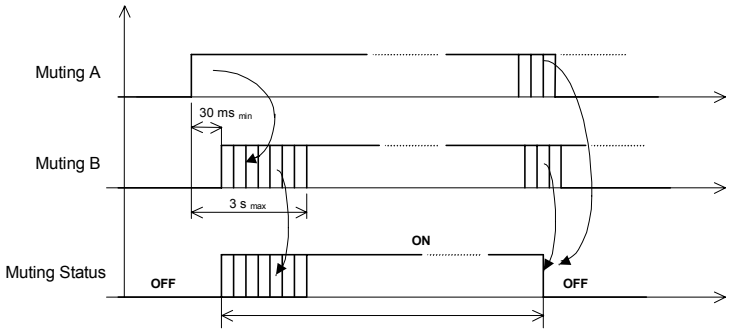
- The TEST/RESTART button must be located so that the operator can see the protected area when restarting, testing or overriding the barrier.
- The external illuminated indicator for *muting override* enabled must be located so that it can be seen from all sides of the operation.
- If photoelectric *muting* sensors are installed very close to the barrier, care must be taken that the receivers of the sensors are mounted on the transmitter side of the barrier in order to avoid interference.
- The system is protected against the possibility of faults occurring due to damage to the receiver/transmitter connection cables; it is however recommended that all cables are physically protected to minimise any such damage.

9.4.1 MUTING ACTUATOR UNITS MF-T AND MF-L

The MF-T and MF-L Muting adaptor units have been designed to be used with the Focus barriers when it is required to mute the protection barrier as shown in the previous examples.
No extra sensors are required as the Muting adaptor units have all necessary components integrated and connected within the aluminium profile housing. All that is required is to physically fix the device to the barrier and make the electrical connections via the M12 connector.
The **MF-T version** contains four photocells, A1, B1, B2 and A2 and is designed for applications where the material travels through the protection barrier either 'in' or 'out', or 'in and out' in both directions. These conditions are the default operations when the MF-T is used with 'standard order' protection barriers. See example 3 on page 24.
The **MF-L version** contains two photocells, A1 and B1 which are physically positioned in front of the protection barrier 'entrance'. This device is preliminary designed for muting in the 'out' direction but can be used in the 'in' direction if suitable precautions are taken. **This version is available upon request together with the muted barrier.**

9.5 TIMING CONSTRAINTS (muting function)

a) The *muting* request must take place with the correct timing sequence; the Muting A input must be enabled first and then the Muting B input. The request for the latter must be made within a maximum of 3 seconds and not before 30 ms after the enabling of the Muting A input. Unless the A and B Muting inputs are operated in the correct sequence and time constraints the *muting* function will not be enabled.
b) *Muting* status can be maintained for an unlimited time according to requirements, provided the request is maintained.



A *muting* request cannot be made if the barrier outputs are de-energised, (when the barrier beams have been interrupted).

9.6 OVERRIDE

This function makes it possible to select a condition of total bypass, should it be necessary to start up the machinery even if one or more beams have been interrupted by material. The objective is to be able to free the protected area from any material that has accumulated in front of the barrier, e.g. after a fault in the machines cycle.
If a *pallet* has stopped in front of the protected area, it will not be possible to restart the conveyor belt because the barrier detects one or more beams have been interrupted and therefore will not energise its outputs; the area controlled therefore cannot be liberated.
The area can however be liberated if the *override* function is enabled.
This function is active for all barriers when the LMS muting indicator is connected, as described in section 3.

9.6.1 ENABLING THE OVERRIDE FUNCTION

- Switch the barrier off.
- Switch it on again and press the *test/restart* ① button within 5 seconds, keeping the button pressed for at least 5 seconds.
- The *override* function is now enabled. The LMS indicator flashes to signal that barrier is being over-ridden.
- The maximum duration of the *override* function is 120 seconds, after which the barrier is restored, even if the button is kept continually pressed. If the button is released before 120 seconds, the *override* function will terminate immediately.

9.7 FLOATING BLANKING

To order this facility add "FB" to the order/model number of the barrier.

9.7.1 DEFINITION OF *FLOATING BLANKING*

Floating Blanking means the permanent masking of a selected number of optical beams in a defined part of the sensitive area of the barrier. The maximum number of optical beams that can be masked depends on the total number of the optical beams in the system.
This cannot be more than 30% of the total number, if however 30% corresponds to more than 20 optical beams, the system will limit the number of optical beams at its maximum number of 20.

Examples are as follows:

Example 1:
Total number of optical beams: = 102

Number of optical beams that can be blanked: = 31
The barrier can have more than 20 optical beams but only 20 can be masked.

Example 2:
Total number of optical beams: =24
Number of optical beams that can be blanked =7
The maximum maskable zone is 7 beams.

9.7.2 MEMORISATION PROCEDURE FOR FLOATING BLANKING

The object is memorised as follows:

1. Switch the barrier off.
2. Put the object to be detected for *floating-blanking* purposes into place.
3. Connect the MUTING A (green) input to 24Vdc. The test/reset ① contact must be closed.
4. Restore the barrier's power supply.
5. Now supply the MUTING B (yellow) input with 24Vdc.
6. The barrier signals successful memorisation of the object by the flashing of the LOWER (yellow) led which confirms acceptance of *floating-blanking*. If the led does not flash at this point, it means that the object takes up an amount of optical beams which is above 30% of those physically present; it should be remembered that the maximum limit is 20 optical beams.
7. Now disconnect the two MUTING A and MUTING B wires from +24Vdc.
8. The barrier works normally and signals the *floating-blanking* operation by the flashing of the LOWER (yellow) led on the receiver.

PLEASE NOTE:
The last optical beam opposite to the connector side **cannot be used** with the *floating-blanking* function, as it is the optical beam for the synchronisation between the barrier transmitter and receiver units.
If *floating-blanking* memorisation is completed without the object, and thus with the beams free, the LOWER (yellow) led will not flash at the end of the process as the entire barrier is operational: this is a simple way to reset the *floating-blanking* function.
If the object memorised, is for any reason removed or occupies a lesser number of optical beams than in the memorisation process, the barrier will signal the anomaly and the outputs will be de-energized. The LOWER (yellow) and BREAK (red) leds will flash to indicate this particular status. It is possible to exit this error status by pressing the TEST/RESTART button provided the object has been replaced.

10 LED DIAGNOSTICS

10.1 WHAT THE LEDS MEAN

The operator is able to observe the operating status of the barrier by means of five leds located on the receiver and two leds on the transmitter.
The status of the leds on the receiver indicate the following:
(looking at the front of the receiver from right to left)

- UP. ALIGN (Yellow):
  When the barrier is in alignment mode; when lit, this indicates the alignment of the optical beam located in the top section of the barrier.
  In normal working conditions the led is not lit and will only light up after the barrier has intervened with free beams in manual reset mode.
- BREAK (Red):
  When lit, this indicates that the barrier has intercepted an object; the outputs are de-energised in this condition.
- GUARD (Green):
  When lit, this indicates that there are no objects placed between the barrier transmitter and receiver units.
- LO. ALIGN (Yellow):
  When lit, this indicates alignment of the optical beam located in the bottom section of the barrier (connector end) when the barrier is in alignment mode. If this led lights up during normal working conditions, this indicates that dust is present on the front of the barrier. If it flashes, there is a short circuit on the outputs.
- POWER (Green):
  When lit, this indicates that the receiver is powered.

The leds placed on the transmitter indicate the following:

- POWER (Green):
  when lit, this indicates that the transmitter is powered

- STATUS OK (Yellow):
  when lit but not flashing, this indicates that the transmitter is working correctly; if it flashes or if it is off, this indicates a transmitter fault.

10.2 ERRORS SIGNALLED BY LED INDICATION

If critical errors are detected by tests (automatically carried out or initiated externally) run by the barriers processors, the leds provide indication of faults/conditions found. The faults/conditions indicated are as follows:

RECEIVER

- Only the POWER(green) power led lit: -system power supply is too low.
- POWER(green) led lit and LO.ALIGN (yellow) led flashing: optical system fault.
- POWER(green) led lit and UP. and LO.ALIGN (yellow) leds flashing: micro controller fault.
- POWER (green) led, UP. and LO.ALIGN (yellow) leds and BREAK (red) led flashing: output system fault.
- POWER (green) led, UP. and LO. ALIGN (yellow) leds and GUARD (green) led flashing: muting lamp connection fault.

TRANSMITTER

- Only the POWER(green) led is lit: system power supply is too low.
- POWER(green) led lit and STATUS OK (yellow) led flashing: optical system fault or micro controller fault.

11 FINAL CHECKS

Check that the area protected by the barrier is free of obstacles. Check that when the protection beams are interrupted the barrier safety outputs operate correctly, the BREAK led is lit and the machinery under control stops.

12 ROUTINE CHECKS AND MAINTENANCE

The following is a list of recommended checks/control procedures that should be carried out on a regular basis by qualified personnel:

- Check that the barrier switches correctly by inserting a suitably sized object that intercepts the beams along the entire protection length; for hand protection use a Ø35mm object, for a finger protection use a Ø14mm object
- Check via the opening of the *TEST/RESTART* contact ①, that the safety relay outputs open (red led lit and controlled machinery stopped).
- Check that it is not possible to access the danger areas of the machinery from any area that is not protected by the barrier and that the minimum distance between the dangerous areas and the barrier is no less than that calculated as per formulas 4.1 and 4.2.)
- Check that it is not possible for a person to get between the barrier and the dangerous parts of the machinery.
- Check that there is no external damage to the barrier and/or to the external electrical connections.

Note

The interval between the above actions depends on the individual application and the environmental conditions where the barrier is being used. All relevant local and national regulations should be consulted for the appropriate required frequency of checks for any specific application. If in any doubt local/national safety inspectorate/bodies should be contacted for advice.

For FOCUS F2 (level 2) series Jokab safety suggest once a day in normal environmental conditions.

13 GENERAL INFORMATION AND USEFUL DATA

Everyone MUST be aware of the issues regarding safety.

It is essential that safety devices are installed correctly according to the recommendations set down by regulations.

If you are not sure that you are able to install safety devices correctly, you should contact our service department or have them installed by a qualified engineer.

This FOCUS barriers are provided with a 12 months warranty from the date of delivery.

Faults that are clearly caused by damage due to incorrect use, accidental circumstances or catastrophic events are not covered by the company's warranty.

For all warranty claims and repairs, please return the barrier to you local JOKAB SAFETY distributor/dealer together with a description of the fault found and the period of use.

14 TECHNICAL SPECIFICATIONS FOR FOCUS

- Power supply: 24 Vdc ± 20%.
- Consumption: 10W max (with both FT and FR connected).
- Beam Emission: Infrared Leds.
- Beam Reception: Photodiodes.
- Number of emitters/receivers: according to model (see table in section 6.4).
- Wavelength of emitters: 950 nm.
- FR indicators: - 2 green leds
  - 2 yellow leds
  - 1 red led
- FT indicators: - 1 green led
  - 1 yellow led
- Response time: according to model (see table in section 6.4).
- Resolution: 14 mm for Fx-14 models.
  35 mm for Fx-35.models.
  Variable for Fx-K models according to number of beams and protection length.
- Operating temperature: -10 to + 55 °C.
- Humidity: 15% to 95% (non condensing).
- Safety outputs: Two 500mA PNP transistor outputs with short circuit protection.
- Max. ON-state voltage: 22V
- Max. OFF-state voltage: 0.5V
- Max. Leakage current: 40μA
- Max. capacitive load: 0.5μF
- Min.cross section of cable on output: 0.25 mm^2 (AWG 30)
- Operating distance: Fx-14: 0.2-6m, Fx-35: 0.2-15m, F2-Kx: 0.5-50m, F4-Kx: 0.5-25m or 4-50m, Fx-K1C: 0.2-6m.
- External controls: *start*/*test*/*override* button, muting inputs
- FR connector: M12 8-pin + screen
- FT connector: M12 5-pin + screen
- Metal housing (aluminium) painted yellow (RAL 1303 F14).
- Mechanical housing dimensions: 35 *45 mm
- Enclosure Protection Class: IP 65.
- *Muting* indicator lamp LMS: max 3 W

For inductive load be sure that the resistance of the coil do not require a current higher than 500mA.

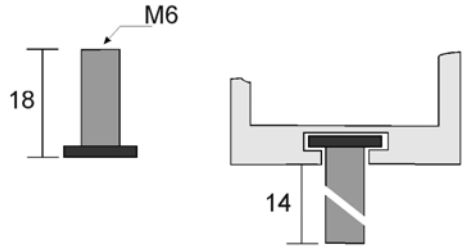
15 MF-T AND MF-L MECHANICAL DATA

- MF-T length: 675mm
- MF-L length: 367mm
- MF-T distance between A1-B1 A2-B2: 150mm
- MF-T distance between A1-A2: 485mm

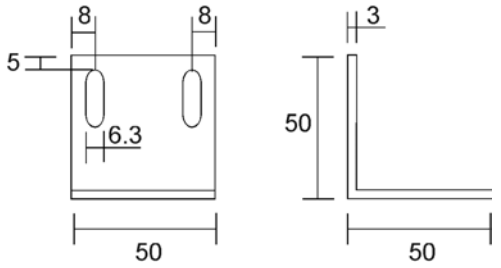
16 DIMENSIONS

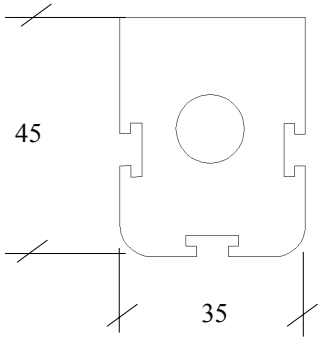
All dimensions are shown in millimetres

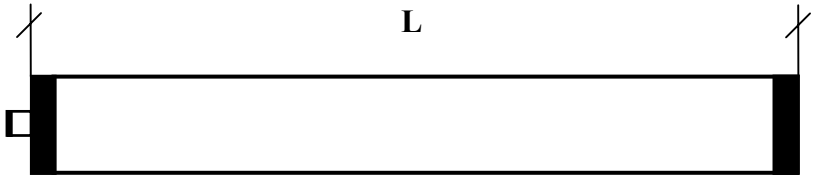
Fixing screw:



Fixing bracket:







L dimension is shown in par. 6.4

17 NOTES: